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Dipole moments of some derivatives of ethylphosphonous and ethylphosphonic acids

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Abstract

1. Measurements were made of the dipole moments of the methyl, ethyl, n-propyl, isopropyl-, n-butyl, isobutyl, hexyl, heptyl, octyl, nonyl, and decyl esters of ethylphosphorous acid. The mean value of the dipole moment of the series was 3.35 D and it was higher than the mean value for the dialkylphosphorous acids (3.08 D). 2. Measurements were made of the dipole moments of the ethyl and n-propyl esters of ethylthiophosphonic acid (mean value of dipole moment 3.08 D) and of the methyl, ethyl and n-propyl esters of trichloromethylethylphosphonic acid. The mean value for the esters 3. Evaluations were made for all the compounds of the geometrical structure and magnitude and direction of the dipole moments of the individual bonds. 4. Calculations of the dipole moments of esters of trichloromethylethylphosphonic acid for various models lead to the conclusion that the esters have a pyramidal structure with free rotation of the OR groups, with a direction of the dipole moment of the P → C bond in the ethyl radical from phosphorus to carbon, and a dipole moment of[Figure not available: see fulltext.]equal to zero due to compensation of the moments of the P←C and the C→Cl2 bonds. © 1954 Consultants Bureau, Inc.

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